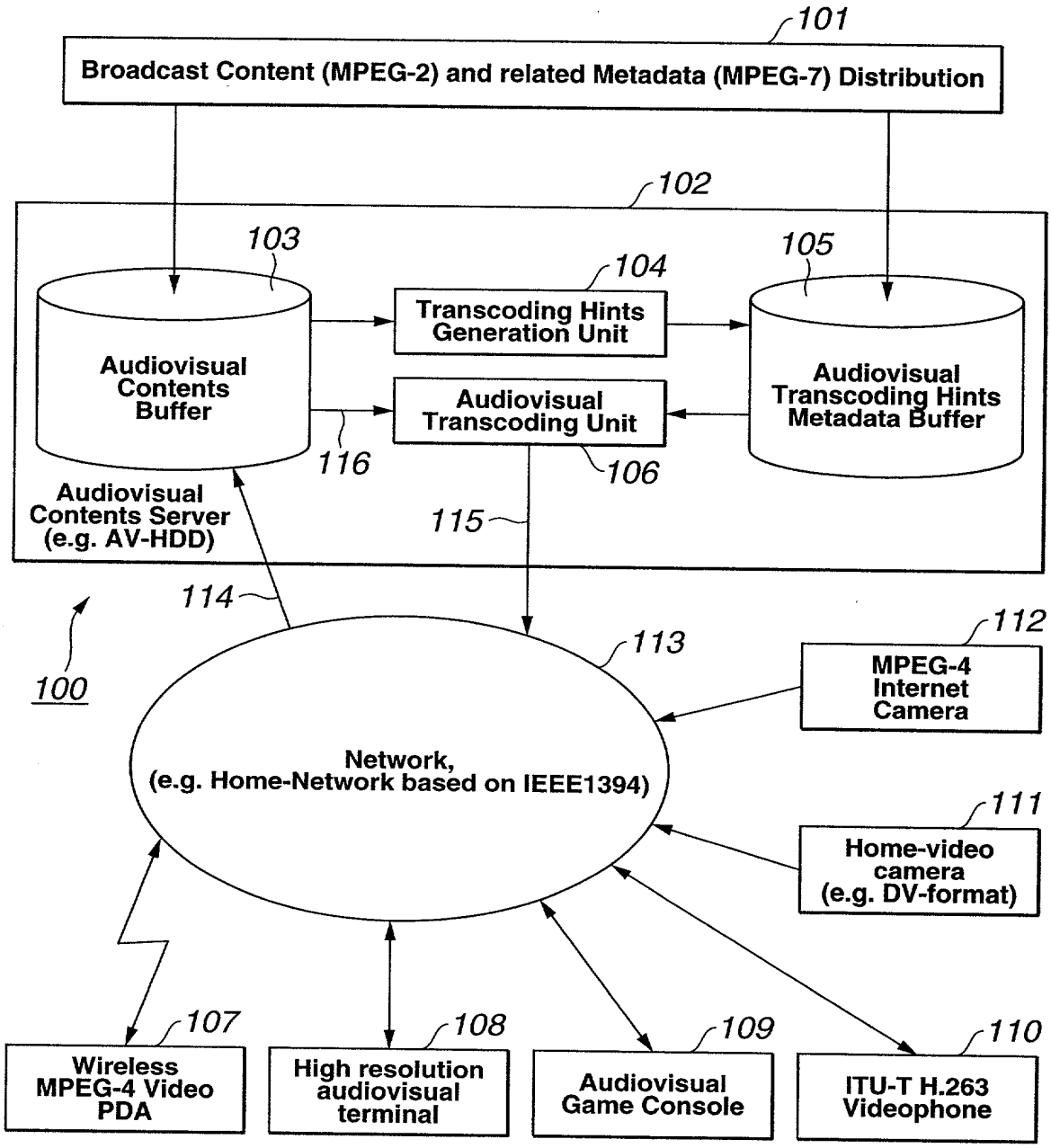
101
Broadcast Content (MPEG-2) and related Metadata (MPEG-7) Distribution
102
103
Audiovisual Contents Buffer
104
Transcoding Hints Generation Unit
105
Audiovisual Transcoding Hints Metadata Buffer
Audiovisual Transcoding Unit
116
106
Audiovisual Contents Server (e.g. AV-HDD)
115
114
100
113
112
MPEG-4 Internet Camera
Network, (e.g. Home-Network based on IEEE1394)
111
Home-video camera (e.g. DV-format)
107
Wireless MPEG-4 Video PDA
108
High resolution audiovisual terminal
109
Audiovisual Game Console
110
ITU-T H.263 Videophone

FIG.1

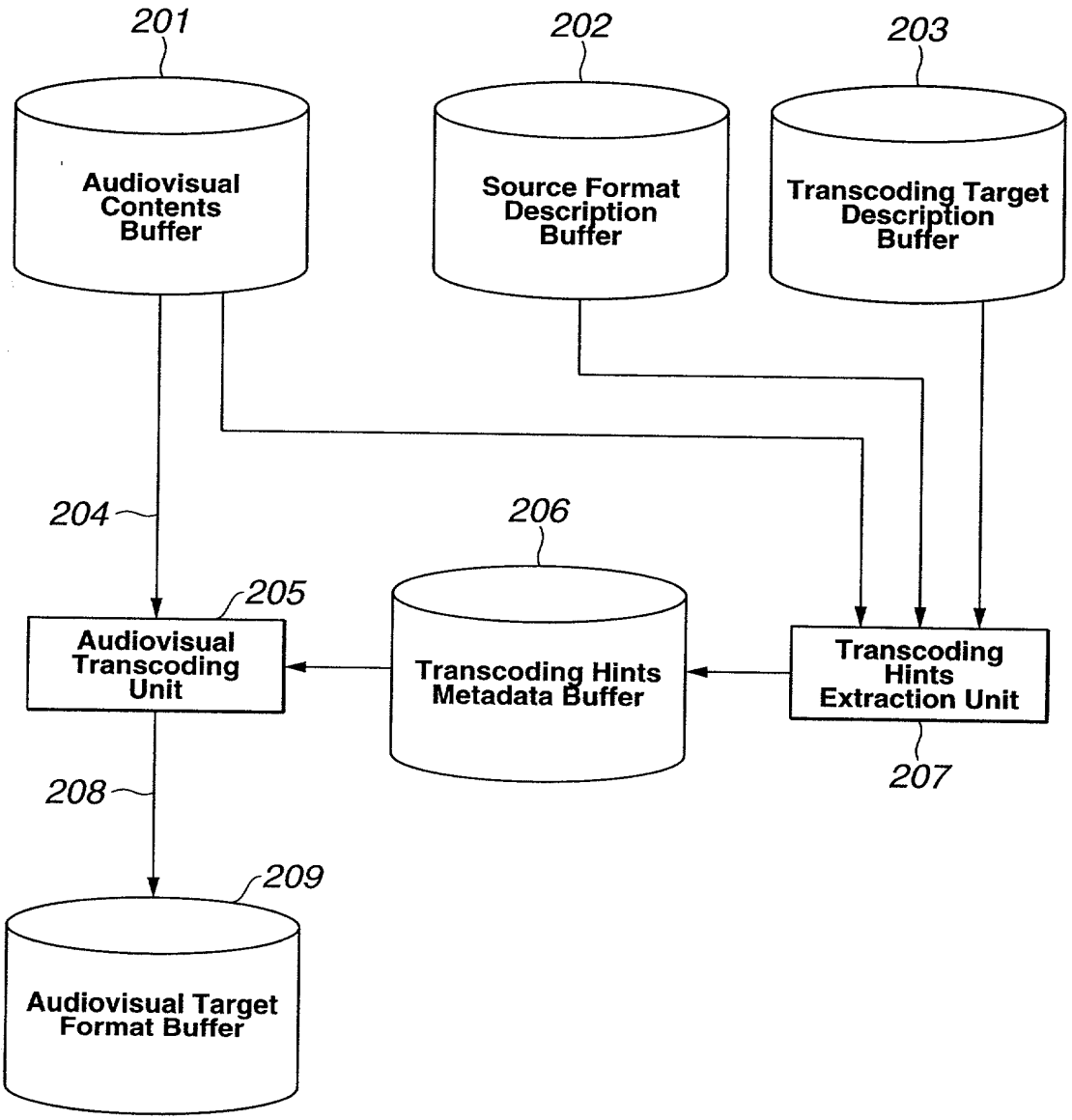
201
202
203
Audiovisual Contents Buffer
Source Format Description Buffer
Transcoding Target Description Buffer
204
206
205
Audiovisual Transcoding Unit
Transcoding Hints Metadata Buffer
Transcoding Hints Extraction Unit
207
208
209
Audiovisual Target Format Buffer

FIG.2

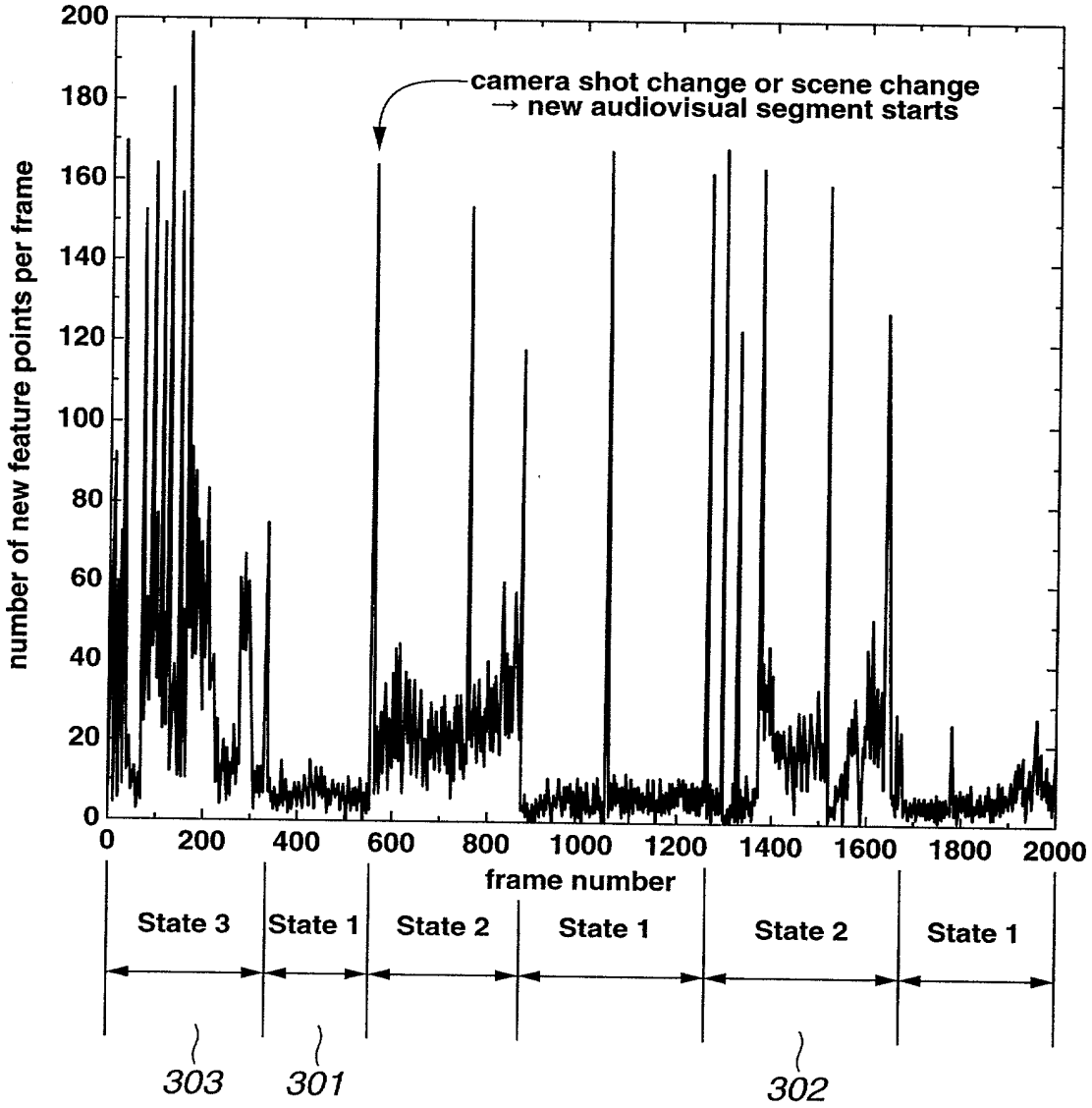
200
180
160
140
120
100
80
60
40
20
0
number of new feature points per frame
camera shot change or scene change
→ new audiovisual segment starts
0
200
400
600
800
1000
1200
1400
1600
1800
2000
frame number
State 3
State 1
State 2
State 1
State 2
State 1
303
301
302

FIG.3

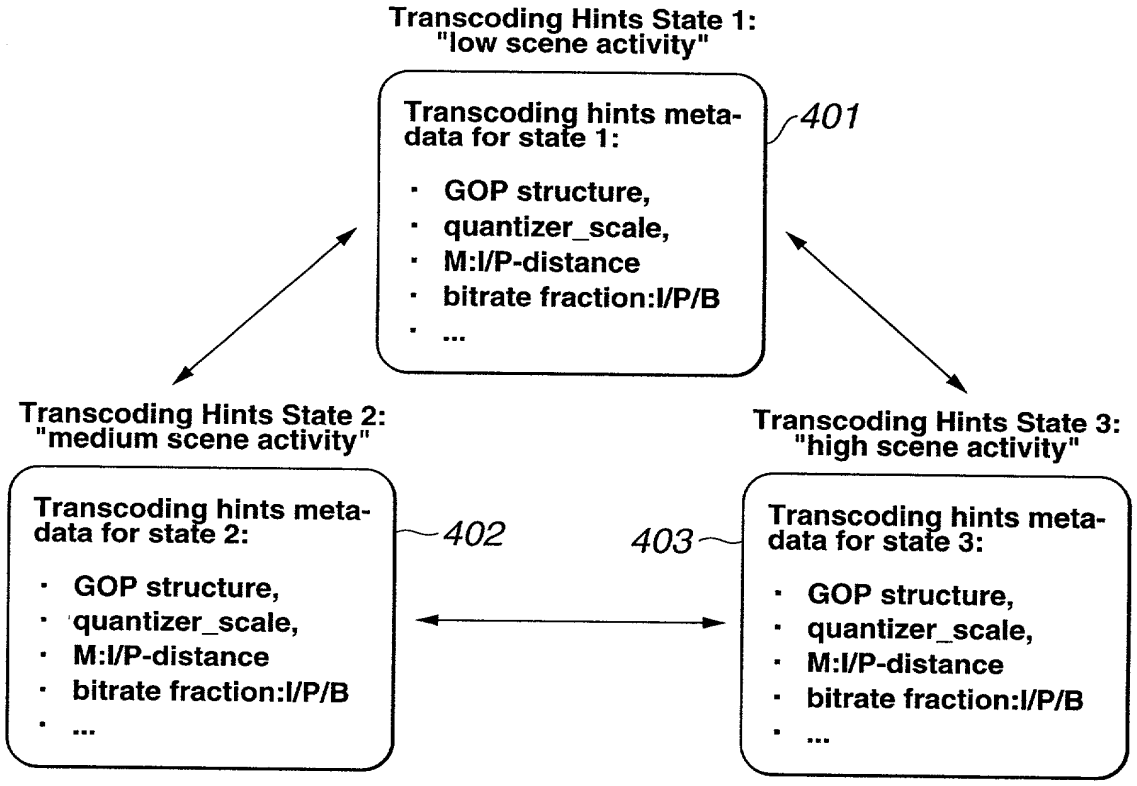
Transcoding Hints State 1:
"low scene activity"
Transcoding hints meta-data for state 1:
GOP structure,
quantizer_scale,
M:I/P-distance
bitrate fraction:I/P/B
...
401
Transcoding Hints State 2:
"medium scene activity"
Transcoding hints meta-data for state 2:
GOP structure,
quantizer_scale,
M:I/P-distance
bitrate fraction:I/P/B
...
402
Transcoding Hints State 3:
"high scene activity"
403
Transcoding hints meta-data for state 3:
GOP structure,
quantizer_scale,
M:I/P-distance
bitrate fraction:I/P/B
...

FIG.4

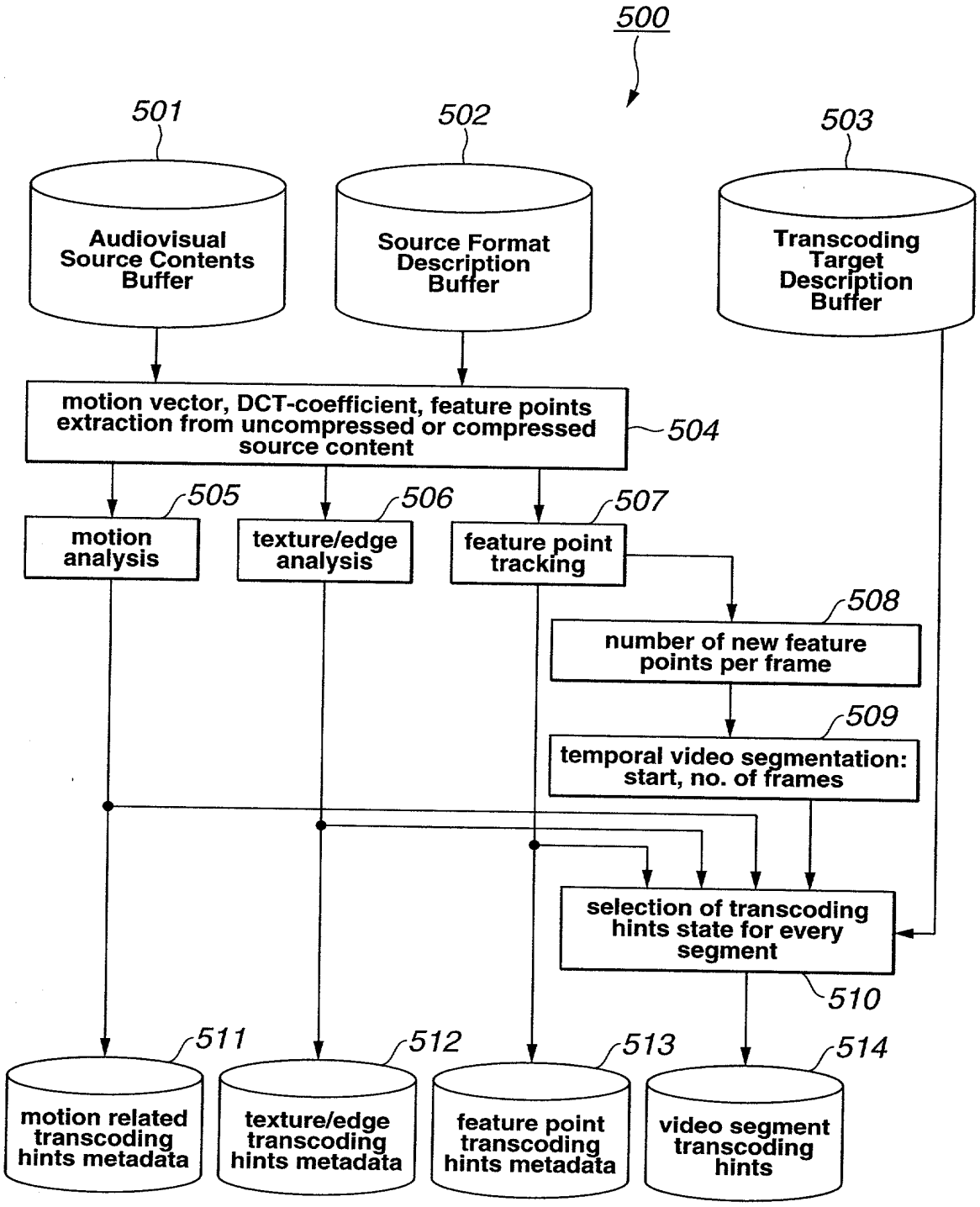
500
501
502
503
Audiovisual Source Contents Buffer
Source Format Description Buffer
Transcoding Target Description Buffer
motion vector, DCT-coefficient, feature points extraction from uncompressed or compressed source content
504
505
506
507
motion analysis
texture/edge analysis
feature point tracking
508
number of new feature points per frame
509
temporal video segmentation: start, no. of frames
selection of transcoding hints state for every segment
510
511
512
513
514
motion related transcoding hints metadata
texture/edge transcoding hints metadata
feature point transcoding hints metadata
video segment transcoding hints

FIG.5

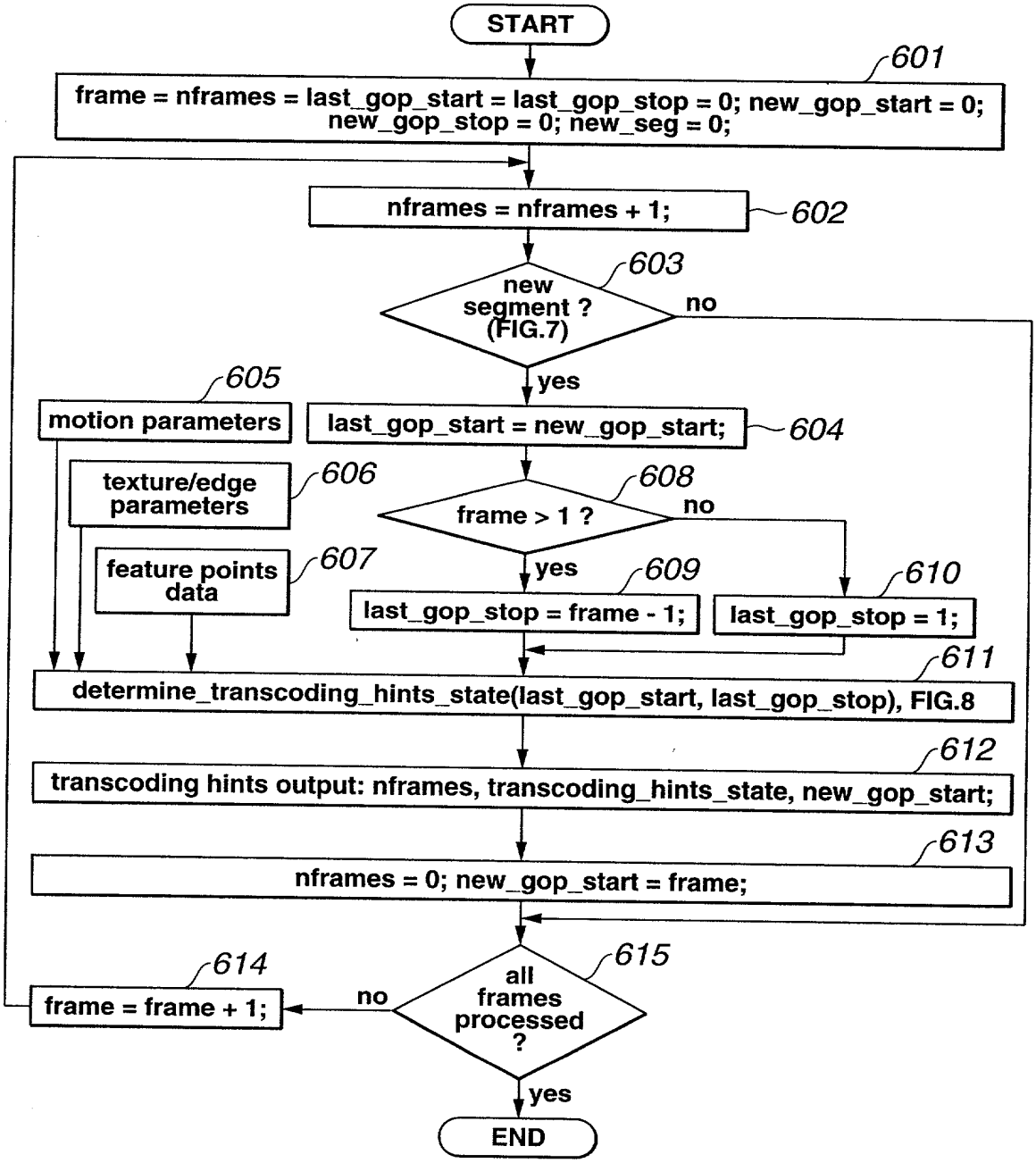
START
601
frame = nframes = last_gop_start = last_gop_stop = 0; new_gop_start = 0; new_gop_stop = 0; new_seg = 0;
nframes = nframes + 1;
602
603
new segment ? (FIG.7)
no
yes
605
motion parameters
last_gop_start = new_gop_start;
604
texture/edge parameters
606
608
frame > 1 ?
no
feature points data
607
yes
609
610
last_gop_stop = frame - 1;
last_gop_stop = 1;
611
determine_transcoding_hints_state(last_gop_start, last_gop_stop), FIG.8
612
transcoding hints output: nframes, transcoding_hints_state, new_gop_start;
613
nframes = 0; new_gop_start = frame;
614
615
frame = frame + 1;
no
all frames processed ?
yes
END

FIG.6

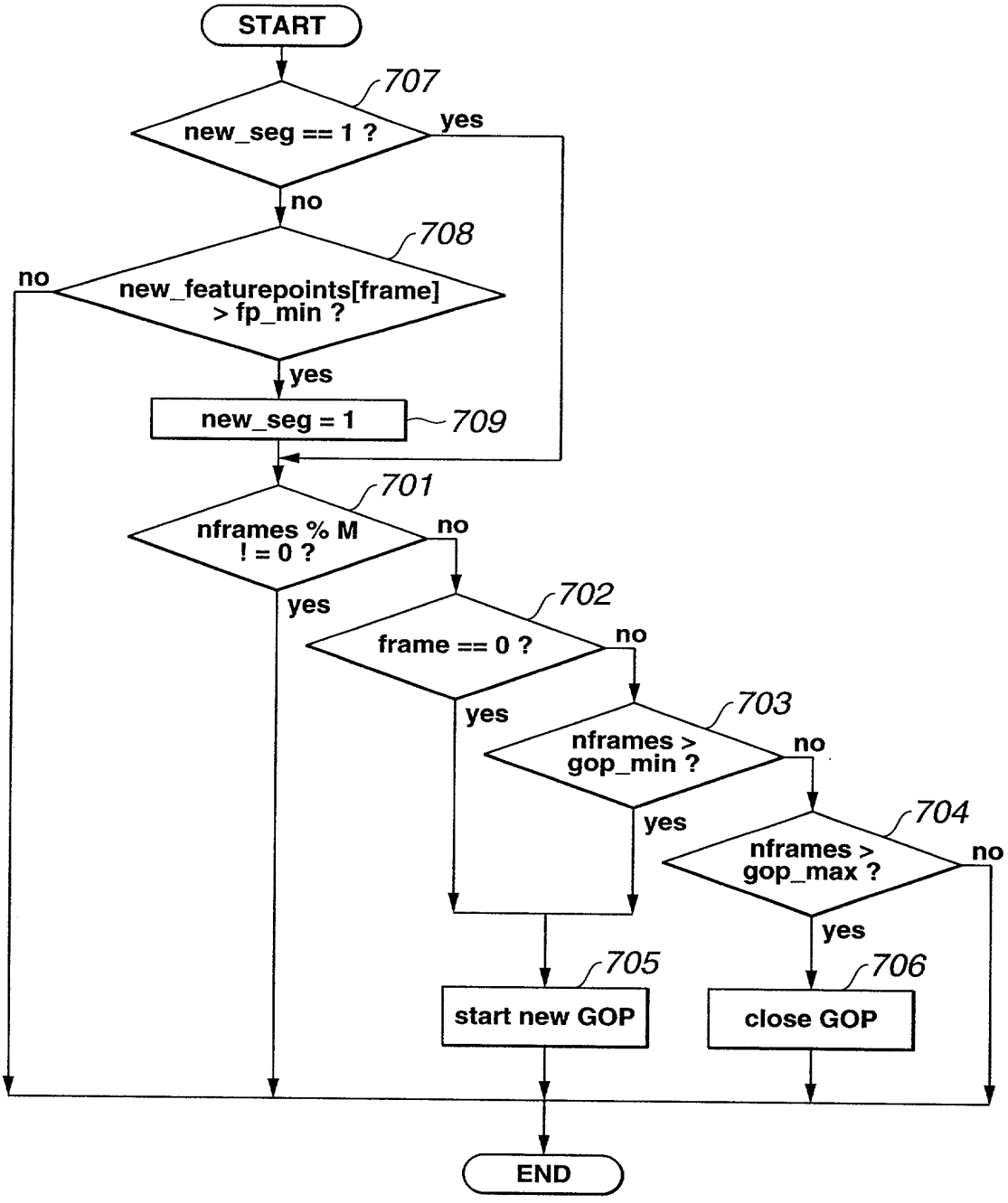
START
707
new_seg == 1 ?
yes
no
708
new_featurepoints[frame] > fp_min ?
no
yes
new_seg = 1
709
701
nframes % M ! = 0 ?
no
yes
702
frame == 0 ?
no
yes
703
nframes > gop_min ?
no
yes
704
nframes > gop_max ?
no
yes
705
start new GOP
706
close GOP
END

FIG.7

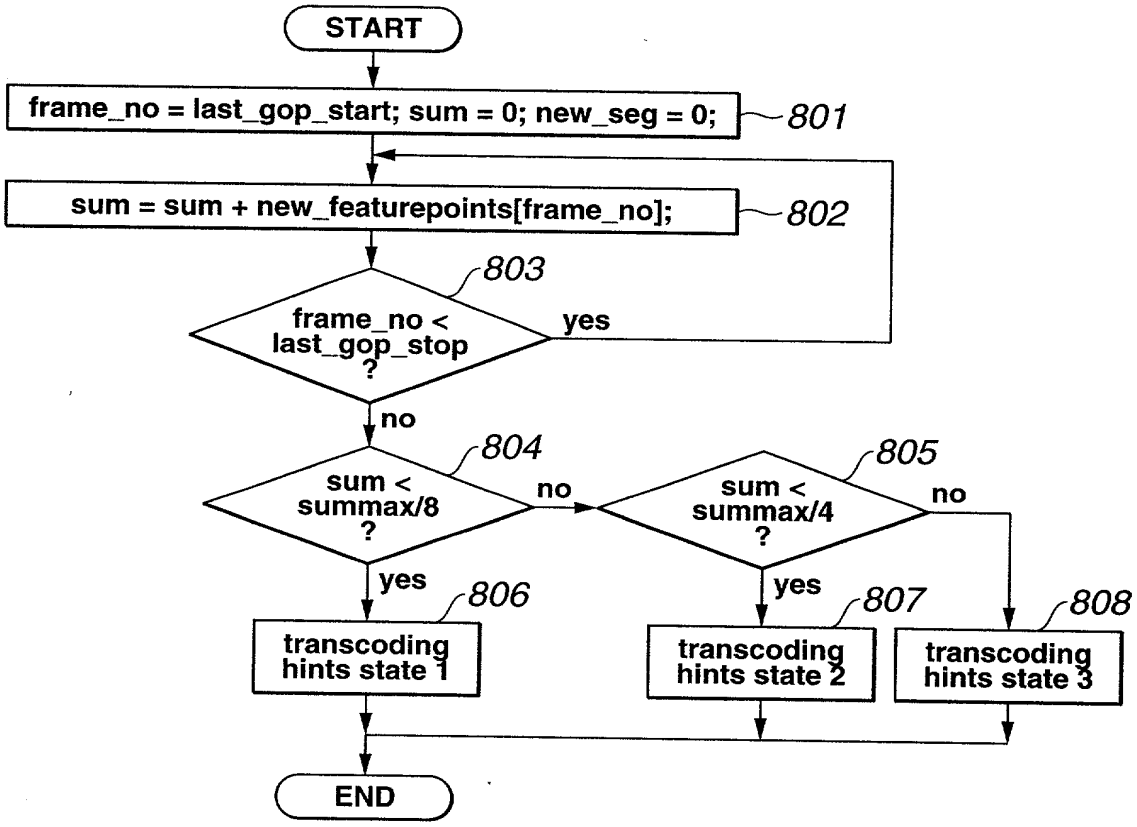

Table 1: Transcoding Hints State Table (example)

State	M	bitrate_fraction_for_I	bitrate_fraction_for_p
1	5	0.8	0.15
2	4	0.85	0.1
3	3	0.9	0.05

FIG.8

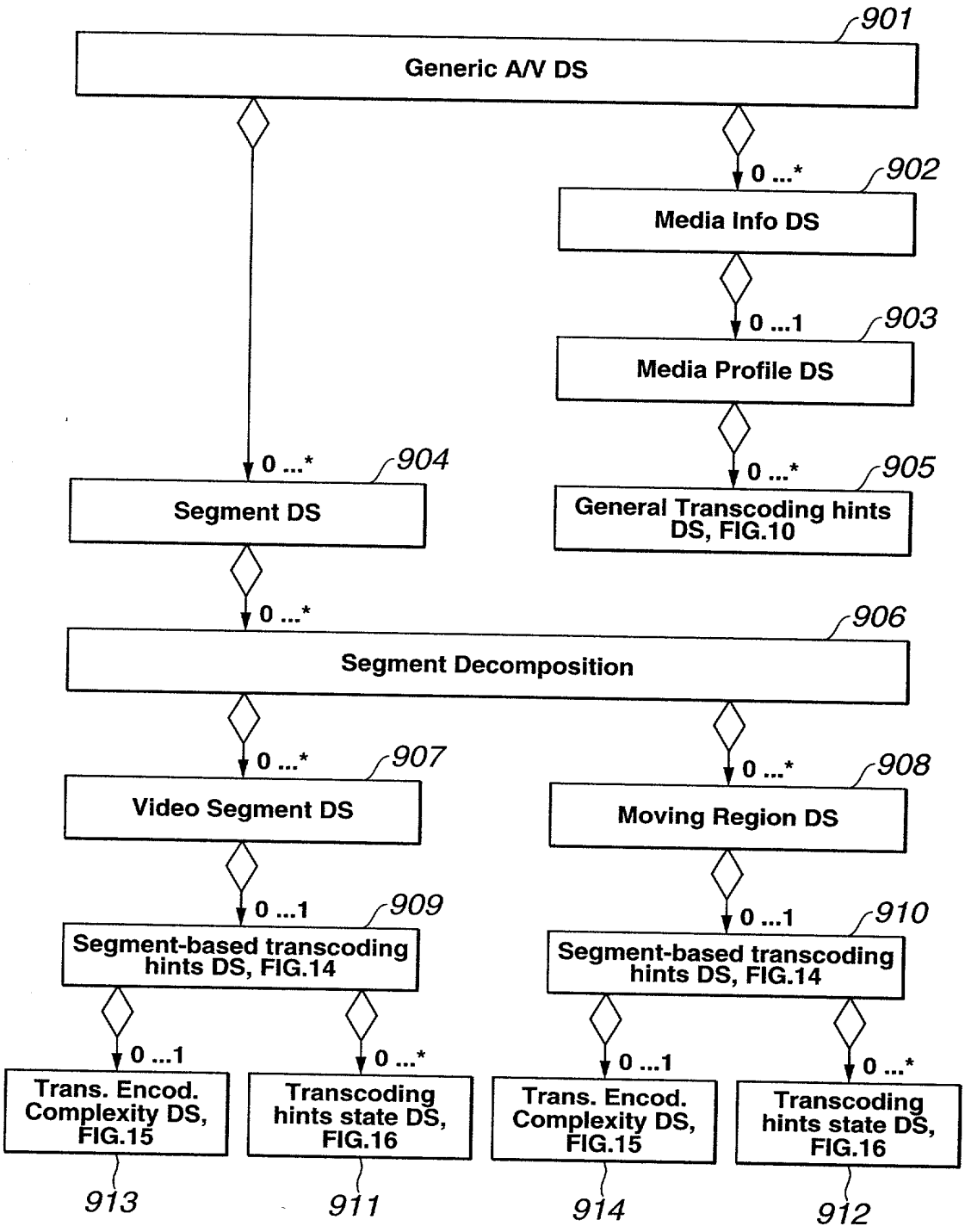
901
Generic A/V DS
0 ...*
902
Media Info DS
0 ...1
903
Media Profile DS
0 ...*
905
General Transcoding hints DS, FIG.10
0 ...*
904
Segment DS
0 ...*
906
Segment Decomposition
0 ...*
907
Video Segment DS
0 ...1
909
Segment-based transcoding hints DS, FIG.14
0 ...1
Trans. Encod. Complexity DS, FIG.15
913
0 ...*
Transcoding hints state DS, FIG.16
911
0 ...*
908
Moving Region DS
0 ...1
910
Segment-based transcoding hints DS, FIG.14
0 ...1
Trans. Encod. Complexity DS, FIG.15
914
0 ...*
Transcoding hints state DS, FIG.16
912

FIG.9

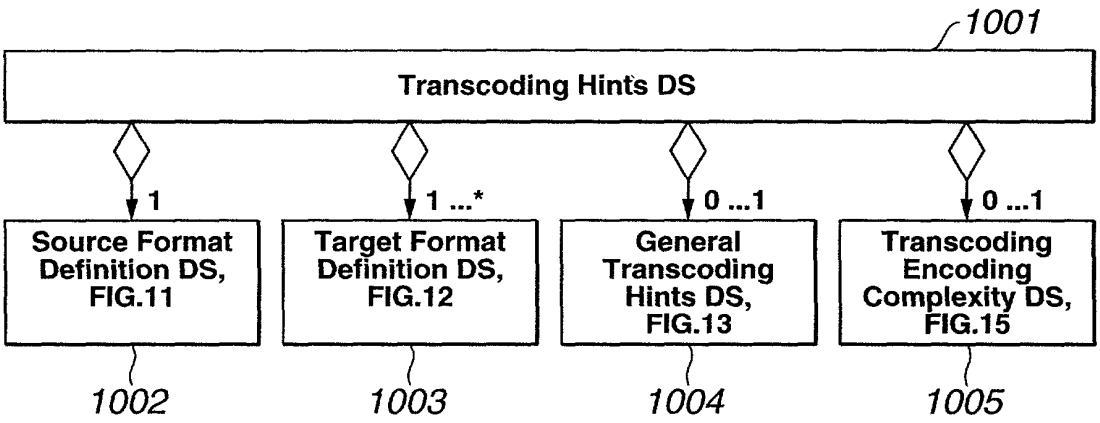

FIG.10

```
1: bitrate <int>
2: size_of_pictures <2*int>
3: number_of_frames_per_second <int>
4: pel_aspect_ratio <float>
5: pel_colour_depth <int>
6: usage_of_progressive_interlaced_format <1 bit>
7: usage_of_frame_field_pictures <1bit>
8: compression method <int>
9:      one out of list {MPEG-1, MPEG-2, MPEG-4, DV, H.263, H.261, .... }
10:     { further parameters for compression method }
11:     GOP_structure (Runlength coding)
```

FIG.11

```
1: bitrate <int>
2: size_of_pictures <2*int>
3: number_of_frames_per_second <int>
4: pel_aspect_ratio <float>
5: pel_colour_depth <int>
6: usage_of_progressive_interlaced_format <1 bit>
7: usage_of_frame_field_pictures <1bit>
8: compression_method <int>
9:        one_out_of_list {MPEG-1, MPEG-2, MPEG-4, DV, H.263, H.261, .... }
10:       { further parameters for compression method }
11:       GOP_structure (Runlength coding)
```

FIG.12

```
1:  use_region_of_interest_DS:  <1bit>
2:          region_of_interest DS:
3:             shape_D: select one or {boundary_box_D, MB_shape_D, shape_D}
4:             motion_trajectory_D
5:
6:   use_editing_effects_transcoding_hints_DS: <1bit>
7:          camera_flash {frame1, frame2, .... framek} <k*int>
8:          cross_fading {(start_frame, end_frame), ...} <k*(<int>, <int>)>
9:          black_pictures {(start_frame, end_frame), ...  <k*(<int>, <int>)>
10:         fade_in {(start_frame, end_frame), ...} <k*(<int>, <int>)>
11:         fade_out {(start_frame, end_frame), ...} <k*(<int>, <int>)>
12:         abrupt_change {frame1, frame2, .... framek} <k*int>
13:
14: use_motion_transcoding_hints_DS:  <1 bit>
15:         number_of_regions:  <int>
16:            for_every_region:
17:                  is_region_rectangular_shaped  (y/n) :  <1bit>
18:                  if_arbitrarily shaped:  use region D for this region
19:                  describe parametric object motion for this region
```

FIG.13

```
1:  start_frame <int>
2:  nframes <int>
3:  I_frame_location:
4:          select_one_out_of_the_following: <2 bit>
5:                  first frame (default)
6:                  list of frames {frame1, frame2, . . . . , framek} <k*int>
7:                  first_frame_and_every_k_frames <int>
8:                  no_I_frame
9:  quantizer_scale <int>
10: target_bitrate <int>
11: target_min_bitrate <int>
12: target_max_bitrate <int>
13: use_transcoding_states (y/n) <1 bit>
14: transcoding_state_nr <int>
15: add_new_transcoding_state (y/n) <1bit>
16:             if yes: {list of parameters}
17: remove_transcoding_state (y/n) <1bit>
18:             if yes: state_nr <int>
19: use_encoding_complexity_description (y/n) <1 bit>
20:             if yes: encoding_complexity_description_scheme
```

FIG.14

```
1:  use_feature_points  (y/n)  <1bit>
2:        select_feature_point_method <2 bits>
3:              number_of_new_feature_points <nframes * int>
4:              feature_point_metrics {mean, max, min, var, stddev} <5* int>
5:  use_equation_description  (y/n)  <1bit>
6:  use_motion_description  (y/n)  <1bit>
7:        select_motion_method <4 bits>
8:              param_k_motion <nframes * k * int>
9:              motion_metrics {min, max, sum, var, stddev} <5*int>
10:             block_motion_field < nframes*int*size_x*size_y / (m*m) >
11: use_texture_edge_metrics  (y/n)  <1bit>
12:       select_texture_edge_metrics <4 bits>
13:             DCT_block_energy <size_y*size_x*nframes*int/64>
14:             DCT_block_activity <size_y*size_x*nframes*int/64>
15:             DCT_energy_metric {mean, min, max, sum, var, stddev} <6*int>
16:             DCT_activity_metric {mean, min, max, sum, var, stddev} <6*int>
```

FIG.15

```
1:  M: I/P distance <int>
2:  bitrate_fraction_for_I <float>
3:  bitrate_fraction_for_P <float>/* bitrate_fraction of B is rest to 100 %)
4:  quantizer_scale_ratio_I_P <float>
5:  quantizer_scale_ratio_I_B <float>
6:  if_frame:   /* see target format transcoding hints */
7:        X_I, X_P, X_B  <3*int> /* frame_vbv_complexities */
8:  if_field:
9:        X_I_top, X_P_top, X_B_top  <3*int> /* field_top_vbv_complexities */
10:       X_I_bot, X_P_bot, X_B_bot  <3*int> /* field_bottom_vbv_complexities */
```

FIG.16